

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

|                                                                                                                      |                                                          |                                                                         |
|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------|
|                                                                                                                      |                                                          | Date of mailing<br>(day/month/year) see form PCT/ISA/210 (second sheet) |
| Applicant's or agent's file reference<br>see form PCT/ISA/220                                                        |                                                          | <b>FOR FURTHER ACTION</b><br>See paragraph 2 below                      |
| International application No.<br>PCT/EP2004/000612                                                                   | International filing date (day/month/year)<br>26.01.2004 | Priority date (day/month/year)                                          |
| International Patent Classification (IPC) or both national classification and IPC<br>G05F1/613, B64G1/44, H01L31/042 |                                                          |                                                                         |
| Applicant<br>EUROPEAN SPACE AGENCY                                                                                   |                                                          |                                                                         |

### 1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

### 3. For further details, see notes to Form PCT/ISA/220.

|                                                                                                                                                                                                      |                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Name and mailing address of the ISA:                                                                                                                                                                 | Authorized Officer                            |
| <br>European Patent Office<br>D-80298 Munich<br>Tel. +49 89 2399 - 0 Tx: 523656 epmu d<br>Fax: +49 89 2399 - 4465 | Vaño Gea, J<br>Telephone No. +49 89 2399-7671 |
|                                                                                                                 |                                               |

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/EP2004/000612

---

**Box No. I Basis of the opinion**

---

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
 This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:  
 a sequence listing  
 table(s) related to the sequence listing
  - b. format of material:  
 in written format  
 in computer readable form
  - c. time of filing/furnishing:  
 contained in the international application as filed.  
 filed together with the international application in computer readable form.  
 furnished subsequently to this Authority for the purposes of search.
3.  In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/EP2004/000612

**Box No. II Priority**

1.  The following document has not been furnished:

copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).  
 translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2.  This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or  
industrial applicability; citations and explanations supporting such statement**

1. Statement

|                               |             |     |
|-------------------------------|-------------|-----|
| Novelty (N)                   | Yes: Claims | 1-7 |
|                               | No: Claims  |     |
| Inventive step (IS)           | Yes: Claims | 1-7 |
|                               | No: Claims  |     |
| Industrial applicability (IA) | Yes: Claims | 1-7 |
|                               | No: Claims  |     |

2. Citations and explanations

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1 Reference is made to the following documents:

D1: EP-A-0 938 141 (LORAL SPACE SYSTEMS INC) 25 August 1999 (1999-08-25)  
 D2: A. MEULENBERG: "Overview, Testing and Solutions to ESD-induced, Solar-array String, On-orbit Failures" PROGRESS IN PHOTOVOLTAICS RESEARCH AND APPLICATIONS, [Online] vol. 8, 16 June 2000 (2000-06-16), pages 315-321, XP002295337 Retrieved from the Internet: URL: <http://www3.interscience.wiley.com/cgi-bin/fulltext/72507918/PDFSTART> [retrieved on 2004-09-07]  
 D3: US-B-6 181 1151 (HAINES JAMES EDWARD ET AL) 30 January 2001 (2001-01-30)

- 2 Document D1 is considered to represent the most relevant state of the art for independent claim 1.
- 3 Document D1 discloses a device according to the preamble of claim 1 (see D1, paragraph [0001] and figure 1). However, a device as defined in the characterizing portion of said claim is not mentioned in the available prior art.
- 4 The technical problem to be solved by the present invention may be regarded as to minimize the risk of a significant power loss from failure propagation by making it impossible for an uncontrolled arcing event on the solar array to be sustained.
- 5 This problem is solved by using a voltage drop detection circuit to detect the uncontrolled arcing event and an arc-quenching circuit to short-circuit the faulty solar array using the power dump stage.
- 6 Document D2 (page 319, lines 19-24) discloses the use of a blocking diode for quenching a similar uncontrolled arc. It is also known from D1, paragraph [0013], that some of the symptoms of the failure are short-circuits between solar cells within an array, which would cause a drop of voltage across the solar array. However, it would be not obvious to the person skilled in the art to add a voltage drop detection circuit to the device according to D1 in order to make the existing power dump stage short-

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)**

International application No.

**PCT/EP2004/000612**

circuit a faulty solar array.

- 7 The subject-matter of independent claim 1 is therefore **novel** and **inventive** (Articles 33(2) and (3) PCT).
- 8 Claims **2 to 7** are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.